

REMARKS

The present amendment and request for consideration is filed in response to the Office Action mailed November 17, 2003, the period of response having been extended to May 17, 2004. Claims 1-8, 10-12, and 14-20 remain pending in the application. Claims 21-41 are withdrawn subject to applicant's right to pursue subject matter of these claims in one or more related applications.

In the Office Action, Claims 1 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,541,165, to Pierrat, in view of U.S. Patent No. 6,586,142, to Lin et al. Applicant respectfully traverses the rejection.

The Pierrat reference cited by the Examiner discloses a double exposure method for creating objects using a binary mask and a phase shift mask. The phase shift mask has an opaque field and a plurality of phase shifting regions therein having adjacent regions of alternating phase. A binary mask includes a clear field having blocking features that cover areas in the phase shift mask that are created with the phase shift mask. See Figures 4 and 5, Col. 6, lines 16-35. In another embodiment, the phase shift mask may include sub-resolution assist features positioned over simulated hot spots of an image. See Figure 17A and Col. 12, lines 9-15.

The Lin et al. reference cited by the Examiner discloses a dual exposure process using a primary and secondary reticle for forming line and hole patterns. The first, or primary, reticle contains an image to be transferred to a layer of photoresist. It is used to expose the photoresist in the usual way to correct the dosage of light needed to optimally activate the resist. A second,

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or correction, reticle bears a pattern of rectangles that are located in dimensions so that they overlap the line ends in the pattern created by the first reticle. The correction reticle is exposed between 4 and 45% of the first exposure. The relationship of the first exposure is chosen to be well below the activation threshold for any previously unexposed resist while still being large enough to raise previously under-exposed areas (such as defraction minima at line edges) above the activation threshold.

Applicant respectfully submits that neither reference cited by the Examiner teaches or suggests the claimed method including defining a bridge structure for a plurality of edges based on spacings of the predictable layout, wherein each bridge of the bridge structure logically connects one of the plurality of edges to a neighboring feature, but does not form a feature in the photolithographic design. The bridge structures of the present invention facilitate assigning phases to adjacent structures by ensuring that features at the opposite ends of each bridge have opposite phases. Because the references cited by the Examiner do not teach or suggest this combination of features, it is submitted that Claims 1 and 17, as well as the claims that depend thereon, are allowable over the cited references.

Claims 1-4, 6, 9-12, and 14-20 were also rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,585,215, to Lee et al., in view of U.S. Patent No. 6,197,452, to Matumoto, in further view of the Pierrat reference.

The Lee et al. reference cited by the Examiner discloses a technique for improving the fidelity of printed mask patterns by inserting additional patterns in the crossing spaces of the mask pattern as shown in Figures 4 and 5. See Col. 6, lines 20-35. Alternatively, the additional

patterns can be placed between features as shown in Figures 6, 7, and 8. See Col. 7, lines 50-65 and Col. 9, lines 40-50. The Lee et al. reference appears to be directed to a variant of sub-resolution assist features and not to a mask whereby adjacent features are assigned opposite phases.

The Matumoto reference cited by the Examiner discloses a technique for generating a wiring pattern by placing a dummy pattern in the vicinity of end portions of the wiring pattern elements. The dummy pattern forms a dummy pattern in the vicinity of the end portions of the linear elements of the wiring pattern. See Col. 1, lines 40-57. There does not appear to be any indication that the dummy pattern is a sub-resolution feature.

Applicant respectfully submits that none of the Matumoto, Lee et al., or Pierrat references teach or suggest the methods of Claims 1 and 17, including defining bridge structures for a plurality of edges that logically connect the plurality of edges to an edge of a neighboring feature, but does not form a feature in the photolithographic design. Absent such teaching or suggestion in the references, it is submitted that Claims 1, 17, and the claims that depend thereon, are allowable.

Applicant notes that the Examiner has indicated that Claims 5, 7, 8, and 13 would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. However, for the reasons set forth above, it is submitted that the claims from which these depend are allowable.

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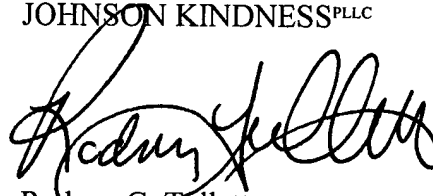
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In light of the above, it is respectfully requested that the Examiner withdraw the rejections and pass this case to issue at the earliest possible date.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

Date: May 13, 2004

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